City of Phoenix
Development Services Department

GRADING AND DRAINAGE PLAN
Checklist

KIVA No: _____ **Project Name:** _____

Reviewed by: _____ **Phone Number:** _____ **Date:** _____

Engineer: _____ **Phone Number:** _____

The purpose of this checklist is to offer comments on plan design for on-site grading. The source of the Grading and Drainage design policy is City Code Chapter 32 and City of Phoenix Storm Drain Design Manual.

This checklist serves to minimize redline comments on the check prints and to maintain consistency among plan reviewers on plans for cuts, fill, drainage swales, drainage structures and pipes, and retention areas. Plan approval, issuing permits, and certain grading clearances depend on compliance with the comments made on the check prints and this checklist. The engineer of record shall satisfy themselves of the completeness and accuracy of the design.

Please return this checklist and the check prints with your next submittal. Discussion of redline comments on plans or this checklist should be directed to the plan reviewer listed above.

Plan approvals are valid for a period of one (1) year from the date of the approval.

The following symbols are used to identify changes needed to the plans.

[X] REQUIRED [√] O.K.

GENERAL REQUIREMENTS:

[ ] **Sheets to be 24" X 36"; submit three (3) sets of grading and drainage and one (1) set of paving plans. Finished floor elevations on grading and drainage plans cannot be approved until street grades are established.**

[ ] **Separate offsite plans with drainage facilities should be submitted with grading and drainage plans unless those details are shown on the grading plan.**

[ ] **Symbols shall be per M.A.G. Specifications and Details.**

[ ] **Cover sheet shall be prepared on vellum or Mylar at the time of approval.**

[ ] **Cover sheet is required on plans of more than two sheets.**

[ ] **All sheets shall have the Civil Engineer's Arizona registration seal and original signature prior to plan submittal.**

[ ] **Original plan sheets shall be sufficiently clear to allow legible prints to be reproduced from microfilm. The size of lettering and symbols shall be 1/8 inch minimum.**

[ ] **Cut and fill quantities, exclusive of street quantities. These shall also be placed on the plan cover sheet in addition to submittal by letter.**

[ ] **Soil reports must be submitted to the Development Services Civil Engineering Division for fills that have one (1) foot or more of fill material indicated. This information must be supplied prior to plan approval/signature. Compaction test results must be furnished to the City prior to request for final inspection and permit final.**

[ ] **Slopes of cuts or fills steeper than 1½:1 require a geological report with plan submittal.**

[ ] **Refer to the City of Phoenix Storm Drain Design Manual for drainage design policy, details, and calculations showing retention volumes to be provided for the required 100-year on-site retention.**

[ ] **A drainage study of the site and contributing areas. Study should include hydrology parameters and assumptions and include methodology for developing quantities. Also include computer runs from HEC-1 or other programs utilized to develop flows from contributing area. Storm water routing through channels should include HEC-2 or other programs used to model the hydraulics including backwater computations. Should a computer program be utilized in design, a disk with input data should be furnished with your plan review submittal.**

[ ] **This project is subject to the National Pollution Discharge Elimination System (NPDES) requirements for construction sites under the Environmental Protection Agency (EPA) General Permit for Arizona. Owners, developers, engineers, and/or contractors are required to prepare all documents required by this regulation, including but not limited to: SWMP, NOI, NOT. Copies of all requirements, forms, and guidance are available in the "Drainage Design Manual for Maricopa County Volume III Erosion Control" available at the Flood Control District, 2801 West Durango, Phoenix, AZ 85009, (602) 506 1501.**

[ ] **Existing irrigation supply ditches and/or irrigation tailwater ditches on this site, or in the right-of-way adjacent to this site, must be replaced with an underground pipeline, or abandoned subject to the approval of the irrigation company and/or downstream users. Limits of construction and scope of work shall be shown on the plan**

COVER SHEET REQUIREMENTS:

[ ] **Blue Stake notification decal.**

[ ] **Indicate plan types:**

- **[ ]** **Grading and Drainage Plan**
- **[ ]** **Grading and Drainage Plan with Drainage Facilities (in Right-of-Way or Easement)**
- **[ ]** **Grading and Drainage Plan with Offsite Improvements (combination)**

[ ] **Project title block with name and address of project.**

[ ] **Vicinity map with north arrow.**

[ ] **Index of plan sheets if more than one plan sheet.**

[ ] **Owner's/Developer's name, address, and telephone number.**

[ ] **Engineer's name, address, and telephone number**

[ ] **Address and legal description of project location.**

[ ] **Appropriate processing numbers including:**
KIVA#, CCPR# or CSPR#, SDEV#, Building log, Abandonment, and City Quarter Section Number in lower right corner.

[ ] **Legend identifying grades, symbols, lines, etc.**

[ ] **Offsite quantities if part of Grading and Drainage Plan submittal.**

[ ] **Elevation datum and benchmarks (City datum required). Telephone (602) 495-2050, ext. 265, to obtain City datum for existing benchmark closest to project site.**

[ ] **Provide net acreage of site.**

[ ] **Provide an As-Built Certification Statement as follows (include on the plans):**

AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE "RECORD DRAWING" MEASUREMENTS AS SHOWN HEREON WERE MADE UNDER MY SUPERVISION OR AS NOTED AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

_____ _____
REGISTERED ENGINEER/ LAND SURVEYOR **DATE**

_____
REGISTRATION NUMBER

NOTES FOR GRADING AND DRAINAGE PLANS:

(to appear on cover sheet)

Grading and Drainage Notes (City of Phoenix)

[ ] **A grading permit is required under Chapter 32A of the Phoenix City Code.**

[ ] **Haul permits, when required, must be obtained prior to or concurrently with the grading and drainage permit.**

[ ] **Excavating Contractor must give location for wasting excess excavation and a letter from Owner giving permission for dumping prior to starting on-site construction. If excess excavation exceeds 100 cubic yards, the disposal site will also require a grading and drainage permit.**

[ ] **Development Services Department Field Inspection Group shall be notified 48 hours before any on-site and/or off-site construction begins, telephone (602) 262-7811.**

[ ] **Minimum finish floor elevations shown are safe from the 100-year flood or per minimum specified in the City of Phoenix Storm Drain Design Manual, whichever is greater.**

Include the note below that is applicable. (Certification of finish floor elevation is mandatory if structure is located in a floodplain or other critical drainage area.) Use the AS-BUILT CERTIFICATION, plus

[ ] **Staking pad elevations is the responsibility of the Owner and his Engineer. The Owner's Engineer shall submit three sealed copies of this Grading and Drainage Plan designated as "Record Drawing" (bearing an original signature) prior to the request for final inspection.**

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[ ] **A Federal Emergency Management Agency (FEMA) " Elevation Certificate" must be completed for each structure constructed in a Special Flood Hazard Area (SFHA) prior to an Electrical Clearance for that structure. One copy of the "Elevation Certificate" is to be submitted to the General Building Safety Inspector on site and one copy is to be submitted to the City of Phoenix Flood Plain Manager.**

In addition, specify the name, address, and telephone number of the Arizona Registered Engineer or Land Surveyor responsible for providing certification.

[ ] **Pad certifications will be required on all lots within the subdivision and submitted to the Civil/Site Inspector prior to any concrete constructed in the right-of-way. Pad certification can be submitted tot he Civil/Site Inspector by either submitting one approved black-line as-built grading and drainage plan or in letter format showing the design and as-built pad elevations as shown on the approved grading and drainage plan. It is required that the as-built plan and letter be sealed by a Civil Engineer or Land Surveyor registered in the State of Arizona.**

[ ] **A separate permit is necessary for any offsite construction.**

[ ] **An approved Grading and Drainage Plan shall be on the job site at all times. Deviations from the plan must be preceded by an approved plan revision.**

[ ] **Grading and Drainage Plan approval includes the construction of all surface improvements shown on the approved plan, including, but not limited to, retention areas, sedimentation basins, and/or other drainage facilities, drainage patterns, walls, curbs, asphalt pavement, and building floor elevation.**

[ ] **Contractor shall provide level bottom in all retention basins at elevations shown on the plans. Slope protection shall be applied to prevent erosion.**

[ ] **Grades shown in retention basins are design finished grades. Should the contractor or any sub-contractor plan to place spoil dirt from footings, utility trenches, landscaping, swimming pools, etc. in the basins, then the basins should be sufficiently over-excavated during the rough grading operation to allow for the placement of the fill or landscaping materials.**

[ ] **Contractor is responsible for locating and confirming depths of all the existing utility lines within proposed retention basin areas. If the basin cannot be constructed per plan because of conflicts, the contractor should discuss modification of basin configuration with the City Inspector to determine if a plan revision or a field change is required.**

[ ] **All drainage protective devices such as swales, interceptor ditches, pipes, protective berms, barrier walls, concrete channels, or other measures designed to protect adjacent buildings or property from storm runoff must be completed prior to building construction.**

[ ] **Retention basin side slopes shall be a maximum of 4:1 unless approval is received from the plan reviewer for a steeper slope.**

[ ] **Required retaining walls shown on the Grading and Drainage Plans are to be reviewed, permitted, and inspected by the Building Safety Branch of the Development Services Department.**

[ ] **Certificate of Occupancy (C of O) and/or final electrical clearance for any building is denied until all grading and drainage improvements are completed.**

[ ] **Existing or newly damaged and/or displaced concrete curb, gutter, sidewalk, or driveway slab that is within the right-of-way shall be repaired or replaced, as noted by City inspectors, before final acceptance of the work.**

[ ] **The Engineering Design on these plans are only approved by the City in scope and not in detail. Construction quantities on these plans are not verified by the City. Approval of these plans are for permit purposes only and shall not prevent the City from requiring correction of errors in the plans where such errors are subsequently found to be in violation of any law, ordinance, health, safety, or other design issues.**

[ ] **The City of Phoenix Police Department enforces laws regulating the operation of commercial vehicles. This includes enforcement of federal, state, county and local laws and ordinances. Questions regarding Commercial Vehicle Enforcement may be directed to the Commercial Vehicle Enforcement Supervisor at (602) 495-7813 (Traffic Bureau South) or (602) 495-6784 (Traffic Bureau North).**

[ ] **<u>The following notes shall be shown on the cover sheet of combination Grading and Drainage and Offsite Improvement Plans:</u>**

- **[ ]** **Construction within the right-of-way shall conform to the latest applicable Maricopa Association of Governments (MAG) Uniform Standard Specifications and Details and the latest City of Phoenix Supplement to the MAG Uniform Standard Specifications and Details.**
- **[ ]** **Plan approval is valid for twelve (12) months. If approval expires, the plans must be resubmitted for City update review and approval.**
- **[ ]** **Compaction shall comply with M.A.G. Section 601.**
- **[ ]** **Obstructions to proposed improvements in the right-of-way shall be removed or relocated before beginning construction of the proposed improvements.**
- **[ ]** **The actual point of pavement matching and/or termination shall be determined in the field by the City of Phoenix, Development Services Department field inspector.**
- **[ ]** **Trees and shrubbery in the right-of-way that conflict with proposed improvements shall not be removed without approval of the City Landscape Architect or his assignees. The permittee shall be responsible for obtaining authorization to remove and/or relocate said trees or shrubbery by calling the Parks and Recreation Department at (602) 262-6501.**

[ ] A pavement cut surcharge shall be assessed on this project for any trenching or potholing in new asphalt pavement that is less than 30 months old. Surcharge fees assessed are in addition to the regular permit fees and are over and above any special backfill, compaction, and pavement replacement stipulations that may be imposed as a condition of permitting. Pavement cut surcharge fees is assessed in accordance with Section 31-38 of the Phoenix City Code.

[ ] Optional Note, Channel Diversion:

[ ] **Construction must be phased so the newly aligned channel is fully operational before the existing drainage channel is filled. Flood water conveyance must be maintained at all times during construction.**

[ ] Additional Notes (required when using HDPE Pipe in right-of-way):

[ ] All HDPE storm drain pipe shall be manufactured, designed and installed in accordance with AASHTO M252, AASHTO M294, MAG and City of Phoenix Supplements to MAG and these special provisions.

[ ] All HDPE storm drain pipe shall be Type `S' corrugated, with watertight joints. HDPE pipe shall not be allowed within a minimum of twenty-four (24) linear feet of an open outfall. The outfall section of storm drain pipe shall be concrete or concrete-lined as shown on the plans.

[ ] At a minimum, all HDPE storm drain pipe joints shall meet the ASTM D-3212 watertight requirement of 10.8 psi (25 column feet of water head).

[ ] The contractor shall provide a copy of an accepted independent 3rd party lab certification that all the pipe and joints to be used on the project meet the ASTM D-3212 watertight standard.

[ ] All HDPE pipe connections to manholes shall meet ASTM C-923 requirements.

[ ] The following notes are required on Grading & Drainage (G&D) plans when special preservation or hillside issues are involved.

[ ] Before grading in areas containing native desert vegetation, the Contractor must obtain a permit from Arizona Department of Agriculture. For information, phone (602) 255-4933/542-0994.

[ ] If property is adjacent to the Phoenix Mountain Preserve, no disturbance of preserve property for access, grading, or other construction purposes will be allowed. The contractor is required to delineate the Mountain Preserve boundary with a temporary fence or other acceptable methods.

[ ] If site has special preservation or hillside issues. The grading plan must show all landscape preservation easements, construction fencing locations, and appropriate areas labeled. Prior to any clearing, grubbing, or grading operations, construction fencing shall be shown on approved plans, permitted and inspected and salvage operations permitted, inspected, and completed.

PLAN SHEET REQUIREMENTS:

[ ] Civil Engineer's Arizona seal and original signature (on each sheet).

[ ] Scale selected for each sheet. One inch equals 40 feet (maximum) for all projects.

[ ] Existing contours or spot elevations, drainage arrows and grade breaks to indicate drainage patterns. Also indicate all 100-year flows from contributing offsite drainage areas.

[ ] Show existing and proposed top of curb, gutter, and sidewalk elevations (both sides) and pavement crown elevations along project frontage at extension of lot lines or every 100' (whichever is less).

[ ] Show and label low curb and high curb elevations.

[ ] Provide spot elevations every 100' on adjacent properties sufficient to depict existing conditions affecting drainage of property to be filled. Usually 50 feet beyond property line will be sufficient.

[ ] Provide cross-sections along all property lines.

[ ] **Show all existing utilities and drainage facilities, including private or S.R.V.W.U.A. irrigation within and adjacent to the property boundaries. Any work on Salt River Project irrigation system requires SRP permit and approved plans. All utilities shall be dimensioned from street monument lines.**

[ ] **Show details at property lines, fences, berms, etc. Also show improvements and finish floor elevations on adjacent property to the proposed development. Show visibility triangles at driveway entrances and at intersections.**

[ ] **Show all existing and proposed easements, dedications, right-of-way, streets, and alleys with dimensions and offsets. Streets shall be identified by name. Streets, alleys, and easements shall be dimensioned at least once and at all breaks. Monument line of streets shall be shown.**

[ ] **All abutting lots shall be identified by lot #, tract, and subdivision or shown unsubdivided.**

[ ] **Dimension all property boundaries, both perimeter and interior lines.**

[ ] **Location of all proposed and existing utilities, structures, paving and other topographic features affected by construction.**

[ ] **The proposed grading should be designed with slopes and topographic features which match the natural grade and boundary area to minimize erosion and sediment transport on to City streets or neighboring properties.**

[ ] **Phased developments shall indicate interim slopes and grades to match proposed work to existing conditions.**

[ ] **Grading Plans showing existing natural washes shall also show existing conditions including line and grade of the wash flowline at 50 ft. intervals. Show distances between banks and elevations at 50 ft. intervals.**

[ ] **Extreme storm outfall shown and labeled with elevation.**

[ ] **Show all proposed retaining walls. Include the length, height, and top of wall elevation for each section of retaining wall. The design and structural calculations for all retaining walls shall be reviewed, approved, permitted, and inspected by the Building Safety Branch of the Development Services Department. Refer to Section 703 of the Zoning Ordinance and Section 32-32 of the Subdivision Ordinance for specific wall height requirements. Variances for any over-height walls must be obtained prior to approval of the Grading and Drainage plan.**

[ ] **Show parking spaces for disabled. Provide grade arrows to verify that slope in parking lot accommodates disabled access requirements, do not exceed 2%. Show on-site ramps to the building with slope arrows showing the area near disabled parking or on ramps to building.**

OTHER REQUIREMENTS WHEN APPLICABLE:

[ ] **All plans revised after the original approval shall be reapproved. The nature of the revisions must also be called out on the cover sheet and on the sheet(s) to be revised. The revision number itself shall consist of a numeral within a triangle. Δ**
Changes on each plan sheet shall be highlighted with "clouding" drawn on the reverse side of originals.

[ ] **Proper consideration must be given to protection of underground parking, basements, and loading docks.**

[ ] **A Pavement Cut Surcharge will be assessed on this project for trenching in new asphalt pavement. This fee will be assessed in addition to the regular permit fees and is over and above any special backfill, compaction, and pavement replacement stipulations that may be imposed as a condition of permitting. Surcharge affects streets newly paved and newly overlaid within the past 30 months.**

[ ] **Delineate the limits of any 100-year designated floodplain and include applicable 100-year water surface elevation lines which traverse the project site.**

[ ] **Hauls greater than 10,000 cubic yards require a permit and approved haul route prior to issuance of Grading and Drainage permit.**

Exhibit "A"

NEW DRY WELL INSTALLATION CHECKLIST

[ ] **Dry well to be set at least 100 feet from any surrounding water production well, underground storage tank, or fuel loading area.**

[ ] **Dry well is not to be constructed in any area where hazardous or toxic materials are stored or handled.**

[ ] **Dry well is not to be located in any area where an accidental spill of hazardous or toxic liquid would drain into the dry well.**

[ ] **Dry well is not to be located at a loading dock where hazardous substances are handled.**

[ ] **Dry well is not to be located within any groundwater saturated zones.**

[ ] **Dry well shall dispose of Storm water run-off only.**

[ ] **The following notes are required on Grading & Drainage (G&D) plans when a dry well is to be installed:**

A. **The owner/developer shall be responsible for registering the dry wells shown on the G&D plan with the Arizona Department of Environmental Quality (A.D.E.Q.). For information about specific requirements, contact the Water Permits Unit at (602) 717-4686**

B. **Dry wells must be drilled a minimum of 10 feet into permeable porous strata or percolation tests will be required. The G&D inspector must be present before backfill or well pipes are placed within any dry wells.**

[ ] **Dry well detail and specifications need to be shown on G&D plans.**

[ ] **Grate elevation for the dry well needs to be shown on G&D plan at minimum of 0.3 feet above bottom of retention basin (allows for silting). For dry wells with bleed-off to City storm drain system the grate needs to be 0.75 feet above bottom of basin.**